Express Mail Label No. EL 565140460 US
Docket No: S1022.81243US00
Mailed May 13, 2005

Amendments to the Written Description of the Specification

Applicant presents replacement paragraphs below indicating the changes with insertions indicated by underlining and deletions indicated by strikeouts and/or double bracketing.

On page 1, after the title insert: --Background Of The Invention--;

On page 1, after "Background of the Invention" but before the first paragraph insert – 1. Field of the Invention--;

Please amend the first paragraph on page 1, lines 1-3, as shown below

--The present invention relates to the testing of microprocessors. It more specifically relates to a method and device ~~of~~ for digital data transmission between a monitoring circuit integrated in a microprocessor chip and an analysis tool.--

On page 1, before the second paragraph beginning on line 4, insert --2. Discussion of the Related Art--;

Please amend the second through fourth paragraphs on page 1, lines 4-29, as shown below

-- Fig. 1 schematically shows an integrated circuit 10 comprising a microprocessor (μP) 12, an internal memory (MEM) 14, and input/output terminals (I/O) 16. Microprocessor 12 is intended to execute a program or [[a]] software stored in memory 14. Under control of the program, microprocessor 12 may process data provided by input/output terminals 16 or stored in memory 14 and read or write data through input/output terminals 16.

To check the proper operation of the microprocessor, a monitoring circuit 18 (TEST) is generally integrated ~~to~~ on integrated circuit 10. Monitoring circuit 18 is capable of reading specific data provided by microprocessor 12 on execution of a program, and of possibly processing the read data. Test terminals 22 connect monitoring circuit 18 to an analysis tool 24. Analysis tool 24 may perform a processing of the received signals, for example, according to commands provided by a user, and ensure a detailed analysis of the operation of microprocessor 12. In particular, analysis tool 24 may determine the program instruction sequence really executed by microprocessor 12.

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The number of test terminals 22 may be on the same order of magnitude as the number of input/output terminals 16, for example, from 200 to 400 terminals. Test terminals 22 as well as the connections of monitoring circuit 18 take up a significant silicon surface area, which causes an unwanted increase in the circuit cost. For this purpose, a first version of integrated circuit 10 comprising monitoring circuit 18 and test terminals 22 is produced in small quantities to adjust debug the program of microprocessor 12 or "user program". After this debugging, a version of integrated circuit 10 ~~rid~~ of without monitoring circuit 18 and ~~of~~ without test terminals 22 is sold. This ~~implies the~~ requires forming of two versions of the integrated circuit, which requires a significant amount of work and is relatively expensive. Further, the final chip is not necessarily identical to the tested chip.--

Please amend the paragraph beginning on page 2, line 26, through page 3, line 4 as shown below:

--Certain events, however, do not correspond to specific instructions of the program executed by microprocessor 12 or do not cause modifications in the execution of the program by microprocessor 12. Thus applies, for example, in the case of a mobile telephony application, to the automatic blanking of the screen of a portable phone controlled by a specific control signal which is not provided by microprocessor 12 of the portable phone. Such events are generally not detected by monitoring circuit 18 and thus do not cause the transmission of messages by monitoring circuit 18 to analysis tool 24. It may also be, for example, specific signals generated by the internal circuits of microprocessor 12.--

On page 3, before line 8, insert --Summary of the Invention--;

Please amend the fourth full paragraph on page 3, lines 15-27 as shown below:

--~~For this purpose, it~~ The present invention provides a method for transmitting digital messages through output terminals of a monitoring circuit integrated ~~to~~ with a microprocessor, the digital ~~message~~ messages being representative of first specific events depending on the execution of an instruction sequence by the microprocessor, comprising the steps of transmitting, to the monitoring circuit through dedicated accesses, a request signal for the sending of a message associated with a specific event from among second specific events independent from the execution of the instruction sequence by the microprocessor and a signal of characteristic data associated with said specific event; having the monitoring circuit read said request message and, if resource management conditions are fulfilled,

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transmitting, through a dedicated access, an acknowledgement message and storing said characteristic data signal; and transmitting a digital message representative of the stored characteristic data signal.

Please amend the third and fourth paragraphs on page 4, lines 6-22 as shown below:

The present invention also provides a device for transmitting digital messages between a monitoring circuit integrated ~~to~~ with a microprocessor and an analysis tool, first digital messages being representative of first specific events depending on the execution of an instruction sequence by the microprocessor. The device comprises means for detecting a specific event from among second specific events independent from the execution of the instruction sequence by the microprocessor; means for transmitting a request for transmitting to the monitoring circuit, when a specific event is detected, a request signal and a characteristic data signal associated with said specific event. Further, the monitoring circuit comprises means for storing the characteristic data signal provided by the request transmission means, means for transmitting to the request transmission means, an acknowledgement signal when the characteristic data signal is stored, and means for transmitting a digital message from said stored characteristic data signal.

According to an embodiment of the present invention, the detection means, the request transmission means, the monitoring circuit, and the microprocessor are integrated ~~in a~~ on the same chip.

On page 4, before line 25, insert --Brief Description of the Drawings--;

On page 5, before line 7, insert --Detailed Description--;

Please amend the seventh paragraph on page 5, lines 20-22, as shown below:

According to a variation of the present invention, interface circuit 28 is not integrated ~~to~~ on chip 10. Request circuit 26 is then directly connected to some of input/output terminals 16.

Please amend the two paragraphs beginning on page 6, line 11 through page 7, line 17 as shown below:

Fig. 4 shows a timing diagram of the signals exchanged between request circuit 26 and monitoring circuit 18 according to the example of embodiment of Fig. 3. Request circuit 26 receives a clock signal CLK which is also provided to microprocessor 12 and to

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monitoring circuit 18. When request circuit 26 receives signals from interface circuit 28 indicating that an event has occurred for which monitoring circuit 18 must transmit a message to analysis tool 24, request circuit 26 sets request signal Rq to the high state and maintains stable on the data bus a specific value of data signal DATA associated with the event. Monitoring circuit 18 samples at clock frequency CLK request signal Rq and data signal DATA over the data bus. When a high state of request signal Rq is detected, monitoring circuit 18 is warned that it must transmit a message in relation with the value of data signal DATA present on the data bus. The ~~memorization~~ storage of data signal DATA by monitoring circuit 18 is performed at the same clock cycle as the detection of the high state of request signal Rq or at a subsequent clock cycle according to the workload of monitoring circuit 18. When the ~~memorization~~ storage is performed, monitoring circuit 18 sets acknowledgement signal Ack to the high state. When, at the next clock cycle, request circuit 26 samples acknowledgement circuit Ack in the high state, request circuit 26 sets request signal Rq to the low state and stops the maintaining of the specific value of data signal DATA on the data bus. The request circuit can then, at a subsequent clock cycle, set request signal Rq back to the high state if an event corresponding to a message to be transmitted by monitoring circuit 18 occurs.

The use of request signals Rq and acknowledgement signals Ack enables avoiding ~~for~~ that the additional messages, associated with events which are not linked to the execution of the program by microprocessor 12, to be transmitted by monitoring circuit 18, modify the normal operation of the monitoring circuit. Indeed, as long as monitoring circuit 18 is busy transmitting to analysis tool 24 determined messages ~~determined~~ based on data provided by microprocessor 12, especially according to standard IEEE-ISTO-5001, it transmits no acknowledgement signal Ack to request circuit 26 even if the request signal is high. Request circuit 26 then maintains the value of data signal DATA present on the data bus. Request circuit 26 may comprise a buffer memory area in which several data DATA to be transmitted to monitoring circuit 18 may be stored as long as monitoring circuit 18 is not available. Given that, generally, request signal 26 only transmits new values of data signal DATA to monitoring circuit 18 at a low frequency with respect to the frequency of message transmission by monitoring circuit 18, the size of such a buffer memory area may be relatively small.

On page 5, line 19, please insert:

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--Such alterations, modifications, and improvements are intended to be part of this disclosure, and are intended to be within the spirit and the scope of the present invention. Accordingly, the foregoing description is by way of example only and is not intended to be limiting. The present invention is limited only as defined in the following claims and the equivalents thereto.

What is claimed is:--